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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/563,572	05/25/2006	Marie-Ange Juliette Etiennette Badet-Denisot	0508-1155	1034

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YOUNG & THOMPSON
209 Madison Street
Suite 500
ALEXANDRIA, VA 22314

EXAMINER	
FRONDA, CHRISTIAN L	
ART UNIT	PAPER NUMBER
1652	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/563,572	BADET-DENISOT ET AL.	
	Examiner	Art Unit	
	CHRISTIAN L. FRONDA	1652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 July 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *20-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *20-38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 January 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/6/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Applicants' election with traverse of Group I and SEQ ID NO: 8 in the reply filed on 07/01/2008 is acknowledged. The traversal is on the grounds that there is no undue burden to search all the inventions and that the technical features of the inventions are not obvious in view of the combination of the cited prior art of Change et al. and Ferguson et al.

Applicants' arguments that a person skilled in the art would not find, with reasonable expectation of success without testing all possibilities, where a 6xHis tag can be inserted into a GFAT protein to provide a GFAT protein that retains its structure and activity have been fully considered. Upon further consideration the restriction requirement has been withdrawn.

2. Claims 20-38 are under consideration in this Office Action.

Claim Rejections - 35 U.S.C. § 101

3. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claims 20-32 and 36 are rejected under 35 USC 101 because the claimed invention is directed to non-statutory subject matter.

The claims, as written, do not sufficiently distinguish over nucleic acids, proteins, and enzymes as they exist naturally because the claims do not particularly point out any non-naturally occurring differences between the claimed products and the naturally occurring products. In the absence of the hand of man, the naturally occurring products are considered non-statutory subject matter. *See Diamond v. Chakrabarty*, 447 U.S. 303, 206 USPQ 193 (1980). The claims should be amended to indicate the hand of the inventor, e.g., by insertion of "Isolated" or "Purified". See MPEP 2105.

Claim Rejections - 35 U.S.C. § 112, 2nd Paragraph

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 20-24, 27-30, and 32-38 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 20 recites the phrase "enzymatically-active protein" which renders the claim indefinite because the specific enzyme activity is not known and not recited. For examination purposes it is assumed that the protein as claimed has glutamine:fructose-6-phosphate amidotransferase (GFAT) activity.

Further, claim 20 recites the phrases "two consecutive amino acids of the GFAT sequence", "sequence deriving from the preceding sequence", and "a sequence having at least 35% sequence identity and/or at least 44% sequence similarity with one of the preceding sequences" which renders the claim vague and indefinite. The specific amino acid sequence and its SEQ ID NO of the GFAT as claimed are not recited and not known. Thus, the specific positions where the purification tag is inserted and the sequence identity and similarity cannot be determined by one of ordinary skill in the art. Dependent claims 21-24, 27-30, and 32-38 are also rejected because they do not correct the defect of claim 20.

Claim 21 recites the phrase "in which the GFAT sequence corresponds to…" which renders the claim indefinite since it is uncertain if the claim is actually limited to the recited bacterial or eukaryotic sources.

Claim 22 recites the phrase "a part of the GFAT sequence corresponding and/or being homologous" which renders the claim indefinite since it is uncertain if the claim is actually limited to the *Escherichia coli* GFAT.

Claim 24 recites the phrase "GFAT sequence corresponds to" which renders the claim indefinite since it is uncertain if the claim is actually limited to SEQ ID NOs: 2, 4, or 6.

Claim 29 recites the phrase "corresponding to the sequences" which renders the claim indefinite since it is uncertain if the claim is actually limited to SEQ ID NOs: 2, 4, or 6.

Claim 34 recites phrase "corresponding to the sequences" which renders the claim indefinite since it is uncertain if the claim is actually limited to SEQ ID NOs: 8, 10, or 12.

Claims 37 and 38 are vague and indefinite because they are missing method steps required to meet the endpoints of modifying the activity of the protein of claim 20 and being useful in treatment of the recited diseases, respectively.

Claim Rejections - 35 U.S.C. § 112, First Paragraph

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 20-24 and 27-38 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Applicants are directed toward the current USPTO Written Description Training Materials made available to the public on 04/11/2008 for information regarding examination of

patent claims for compliance with the written description requirement of 35 U.S.C. 112, first paragraph.

The claims are genus claims encompassing a genus of enzymatically active GFAT proteins for which no sequence and structure is apparent having a purification tag inserted between two consecutive amino acids; a genus of enzymatically active GFAT proteins for which no sequence and structure is apparent having a purification tag inserted between two consecutive amino acids and deriving from a sequence by suppression, insertion or mutation of at least one amino acid provided that the proteins have GFAT activity; a genus of enzymatically active GFAT proteins for which no sequence and structure is apparent having a purification tag inserted between two consecutive amino acids and having at least 35% sequence identity and/or at least 44% sequence similarity with a sequence; a genus of enzymatically active GFAT proteins for which no sequence and structure is apparent having a purification tag inserted between two consecutive amino acids in which part of the GFAT sequence corresponding and/or being homologous to the sequence extending approximately between amino acids 30-80, 220-230, or 235-250 of the *Escherichia coli* GFAT; a genus of enzymatically active GFAT proteins for which no sequence and structure is apparent having a purification tag inserted between two consecutive amino acids of a human GFAT sequence between amino acids 40-50, 290-330, and/or 340-370; and a genus of nucleic acids comprising or being constituted by a sequence encoding the protein of claim 20.

The scope of each genus includes many members with widely differing amino acid/nucleotide sequences and structures, where each genus is highly variable because a significant number of structural and biological differences between genus members exists.

The claimed proteins having an amino acid sequence with the recited amino acid sequence alterations represent a partial structure. There is no teaching in the specification regarding which amino acid residues can be altered as claimed while retaining GFAT activity. There is no teaching in the specification regarding which amino acids residues in the amino acid sequence of the protein where suppression, insertion or mutation of any amino acid can be made while retaining GFAT activity. Thus, one of ordinary skill in the art would not be able to identify the specific amino acid residues in the protein that can be altered as claimed without further testing and/or testing all the possibilities, where the protein still retains GFAT activity.

While the specification discloses the an isolated protein of consisting SEQ ID NO: 8 encoded by the nucleic acid of SEQ ID NO: 7, an isolated protein of consisting SEQ ID NO: 10 encoded by the nucleic acid of SEQ ID NO: 9, and isolated protein of consisting SEQ ID NO: 12 encoded by the nucleic acid of SEQ ID NO: 11; the specification, however, does not describe and define any structural features, amino acid sequences, and/or biological functions that are commonly possessed by members of each genus. The specification dos not provide a correlation between any structure and GFAT activity, other than SEQ ID NOs; 8, 10, and 12, based on which those of ordinary skill in the art could predict which amino acids can have an insertion of any purification tag without losing catalytic activity. Further, there is no art-recognized correlation between any structure and GFAT activity, other than SEQ ID NOs; 8, 10, and 12, based on which those of ordinary skill in the art could predict which amino acids can have an insertion of any purification tag without losing catalytic activity.

MPEP § 2163 states that a representative number of species means that the species which are adequately described are representative of the entire genus. Thus, when there is substantial variation within the genus, one must describe a sufficient variety of species to reflect the variation within the genus. In this case, the specification fails to disclose additional proteins having GFAT activity. As such the disclosure of the above mentioned GFAT proteins consisting of the amino acid sequences of SEQ ID NOs: 8, 10, or 12, respectively, is insufficient to be representative of the attributes and features common to all the members of each claimed genus.

Vas-Cath, Inc. v. Mahurkar, 19USPQ2d 1111, clearly states that "applicant must convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the invention. The invention is, for purposes of the 'written description' inquiry, whatever is now claimed." (See page 1117.) The specification does not "clearly allow persons of ordinary skill in the art to recognize that [he or she] invented what is claimed." (See *Vas-Cath* at page 1116). One cannot describe what one has not conceived. See *Fiddes v. Baird*, 30 USPQ2d 1481 at 1483. In *Fiddes*, claims directed to mammalian FGF's were found to be unpatentable due to lack of written description for that broad class, where the specification provided only the bovine sequence.

In view of the above considerations, one of skill in the art would not recognize that applicants were in possession of the each claimed genus.

9. Claims 20-24 and 27-38 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for an isolated protein of consisting SEQ ID NO: 8 encoded by the nucleic acid of SEQ ID NO: 7, an isolated protein of consisting SEQ ID NO: 10 encoded by the nucleic acid of SEQ ID NO: 9, and an isolated protein of consisting SEQ ID NO: 12 encoded by the nucleic acid of SEQ ID NO: 11, a eukaryotic or prokaryotic vector comprising said nucleic acid of SEQ ID NO: 7, SEQ ID NO: 9, or SEQ ID NO: 11; **does not** reasonably provide enablement for any other embodiment as recited in the claims. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims.

According to MPEP 2164.01(a), factors considered when determining whether there is sufficient evidence to support a determination that a disclosure does not satisfy the enablement requirement and whether any necessary experimentation is "undue" include, but are not limited to: (A) The breadth of the claims; (B) The nature of the invention; (C) The state of the prior art; (D) The level of one of ordinary skill; (E) The level of predictability in the art; (F) The amount of direction provided by the inventor; (G) The existence of working examples; and (H) The quantity of experimentation needed to make or use the invention based on the content of the disclosure.

MPEP§ 2164.04 states that while the analysis and conclusion of a lack of enablement are based on the factors discussed in MPEP § 2164.01(a) and the evidence as a whole, it is not necessary to discuss each factor in the written enablement rejection. The language should focus on those factors, reasons, and evidence that lead the examiner to conclude that the specification fails to teach how to make and use the claimed invention without undue experimentation, or that the scope of any enablement provided to one skilled in the art is not commensurate with the scope of protection sought by the claims. Accordingly, the factors most relevant to the instant rejection are addressed in detail below.

The nature and breadth of the claims encompass any enzymatically active GFAT proteins for which no sequence and structure is apparent having a purification tag inserted between two consecutive amino acids; any enzymatically active GFAT proteins for which no sequence and structure is apparent having a purification tag inserted between two consecutive amino acids and

deriving from a sequence by suppression, insertion or mutation of at least one amino acid provided that the proteins have GFAT activity; any enzymatically active GFAT proteins for which no sequence and structure is apparent having a purification tag inserted between two consecutive amino acids and having at least 35% sequence identity and/or at least 44% sequence similarity with a sequence; any enzymatically active GFAT proteins for which no sequence and structure is apparent having a purification tag inserted between two consecutive amino acids in which part of the GFAT sequence corresponding and/or being homologous to the sequence extending approximately between amino acids 30-80, 220-230, or 235-250 of the *Escherichia coli* GFAT; any enzymatically active GFAT proteins for which no sequence and structure is apparent having a purification tag inserted between two consecutive amino acids of a human GFAT sequence between amino acids 40-50, 290-330, and/or 340-370; and any nucleic acids comprising or being constituted by a sequence encoding the protein of claim 20.

The reference of Chica et al. (Curr Opin Biotechnol. 2005 Aug;16(4):378-84; PTO 892) teaches that the complexity of the structure/function relationship in enzymes has proven to be the factor limiting the general application of rational enzyme modification and design, where rational enzyme modification and design requires in-depth understanding of structure/function relationships.

The specification provides guidance, prediction, and working examples for an isolated protein of consisting SEQ ID NO: 8 encoded by the nucleic acid of SEQ ID NO: 7, an isolated protein of consisting SEQ ID NO: 10 encoded by the nucleic acid of SEQ ID NO: 9, and isolated protein of consisting SEQ ID NO: 12 encoded by the nucleic acid of SEQ ID NO: 11. However, the specification does not provide guidance, prediction, and working examples for making and/or using the invention as claimed.

There is no teaching in the specification regarding which amino acid residues can be altered as claimed while retaining GFAT activity. There is no teaching in the specification regarding which amino acids residues in the amino acid sequence of the protein where suppression, insertion or mutation of any amino acid can be made while retaining GFAT activity. Thus, one of ordinary skill in the art would not be able to identify the specific amino acid residues in the protein that can be altered as claimed without further testing and/or testing all the possibilities, where the protein still retains GFAT activity.

The specification dos not provide a correlation between any structure and GFAT activity, other than SEQ ID NOs; 8, 10, and 12, based on which those of ordinary skill in the art could predict which amino acids can have an insertion of any purification tag without losing catalytic activity. Further, there is no art-recognized correlation between any structure and GFAT activity, other than SEQ ID NOs; 8, 10, and 12, based on which those of ordinary skill in the art could predict which amino acids can have an insertion of any purification tag without losing catalytic activity.

Thus, one must perform an enormous amount of trial and error experimentation to search and screen for the claimed proteins from any biological source or synthesize the proteins and determine if the proteins still retain GFAT activity upon insertion of any purification tag sequence. General teaching regarding screening and searching for the claimed invention using activity assays stated in the specification is not guidance for making the claimed invention.

Therefore, in view of the overly broad scope of the claims, the specification's lack of specific guidance and prediction, the specification's lack of additional working examples, and the amount of experimentation required; it would require undue experimentation for a skilled artisan to make and use the claimed invention. Without sufficient guidance, the experimentation left to those skilled in the art is unnecessarily and improperly extensive and undue. See *In re Wands* (858 F.2d 731, 8 USPQ 2nd 1400 (Fed. Cir. 1988).

Conclusion

10. No claims are allowed.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christian L Fronda whose telephone number is (571)272-0929. The examiner can normally be reached Monday-Thursday and alternate Fridays between 9:00AM - 6:30PM. If attempts to reach the examiner by telephone are unsuccessful, the

examiner's supervisor, Nashaat Nashed can be reached on (571)272-0934. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

12. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Christian L. Fronda/
Patent Examiner
Art Unit 1652